

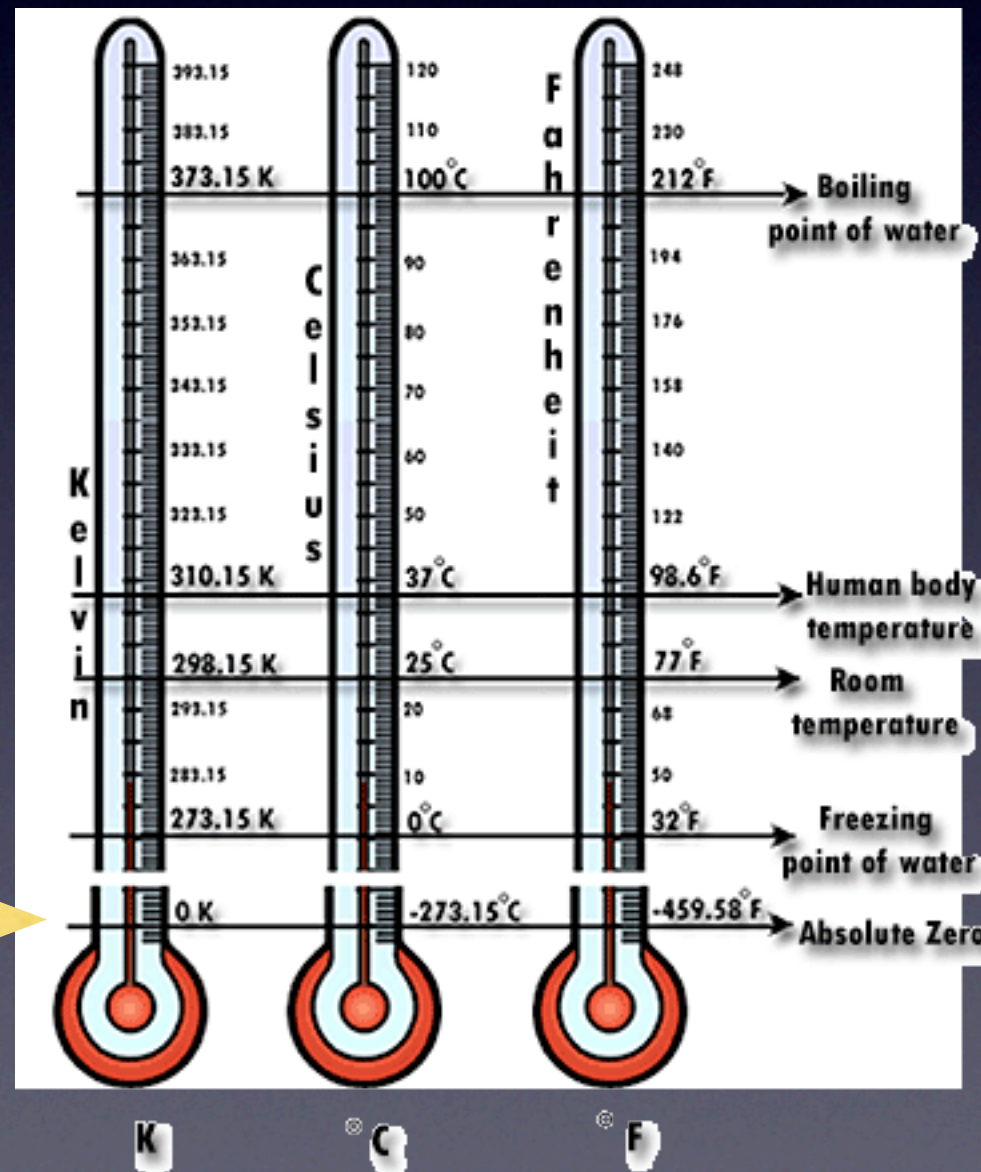
Gas Laws

Volume, Pressure, Temperature: a look at these conditions

Volume: the amount of space gas particles occupy.
Why can gases be easily compressed?

Temperature:
a measure of the
average kinetic energy
of a substance

no particle motion
no particle energy



Only the Kelvin
Scale is directly
proportional to
kinetic energy.

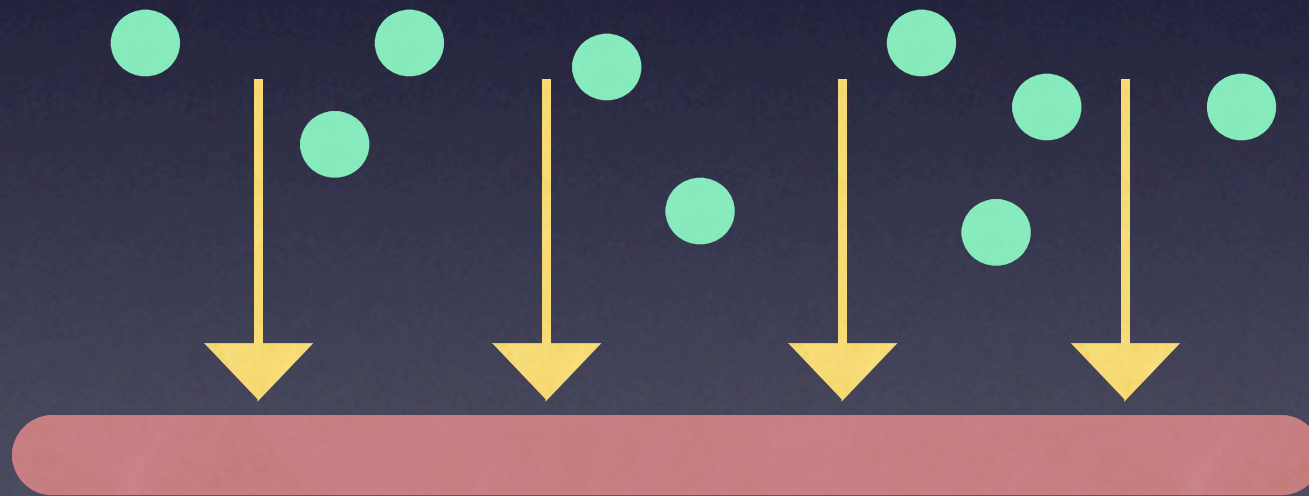
absolute
zero =
0 K
-273 C

pressure:

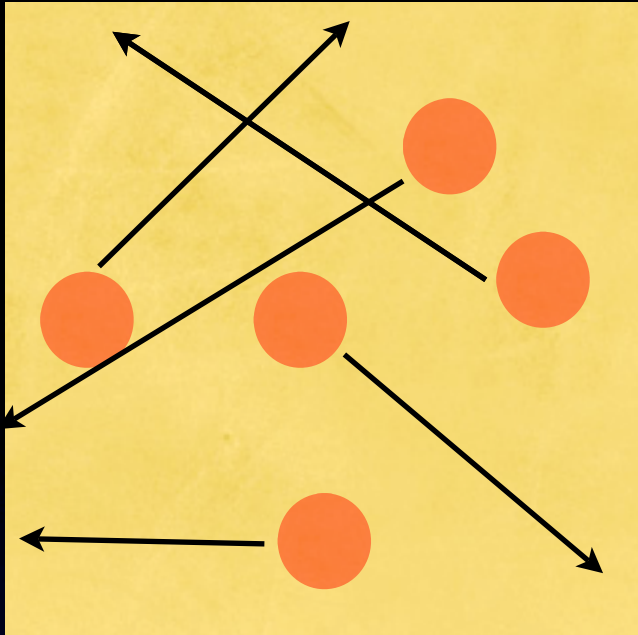
the WEIGHT of the air

or....

the FORCE of air particles on a surface

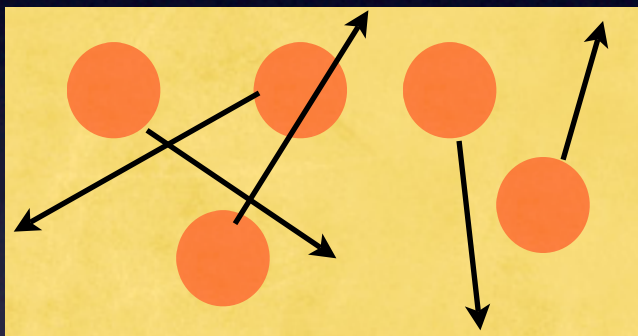


What affects this force?



Collisions with container walls create a force, or pressure.

What happens when volume is decreased?



Decreasing the volume increases the number and force of collisions, thus increasing the pressure.

VOLUME AFFECTS GAS PRESSURE!

LOWEST

Where is the air pressure the highest?

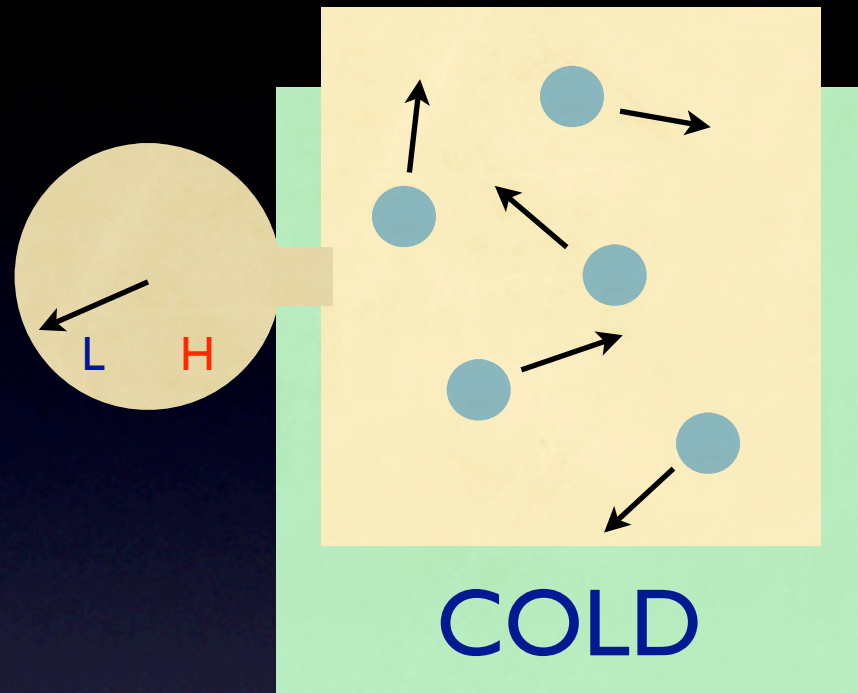
Where is the air pressure the lowest?

What factor here is affecting air pressure?

HIGHEST

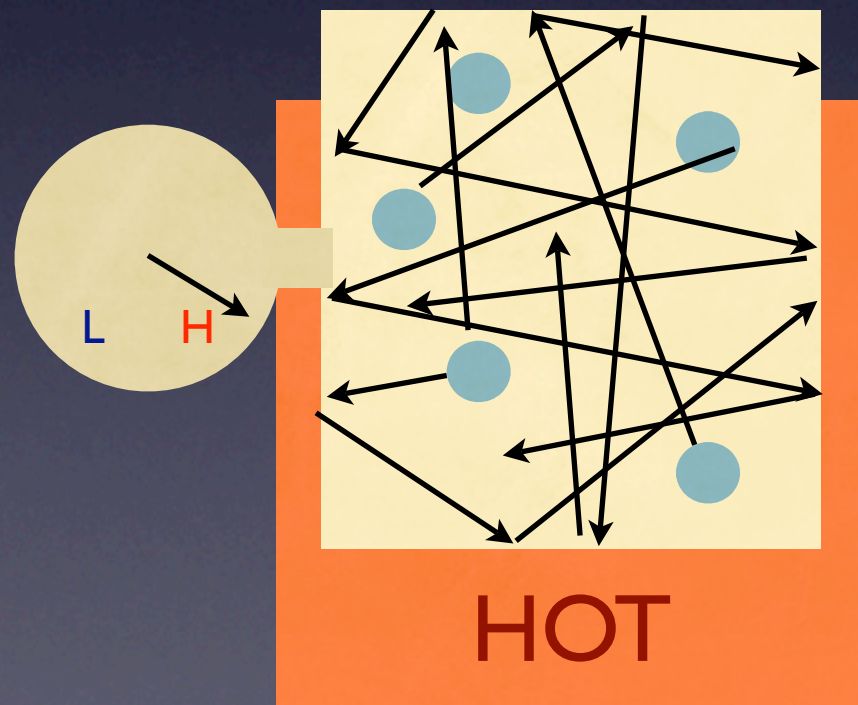
THE AMOUNT OF GAS
(# OF PARTICLES)

How does temperature affect gas pressure?



low temperature = low kinetic energy
= low number of collisions

= LOW PRESSURE



high temperature = high kinetic energy
= high number of collisions

= HIGH PRESSURE

SUMMARY: What factors affect gas pressure?

volume

amount of gas

temperature

PROVE IT!!!

How are volume and pressure in a gas related?



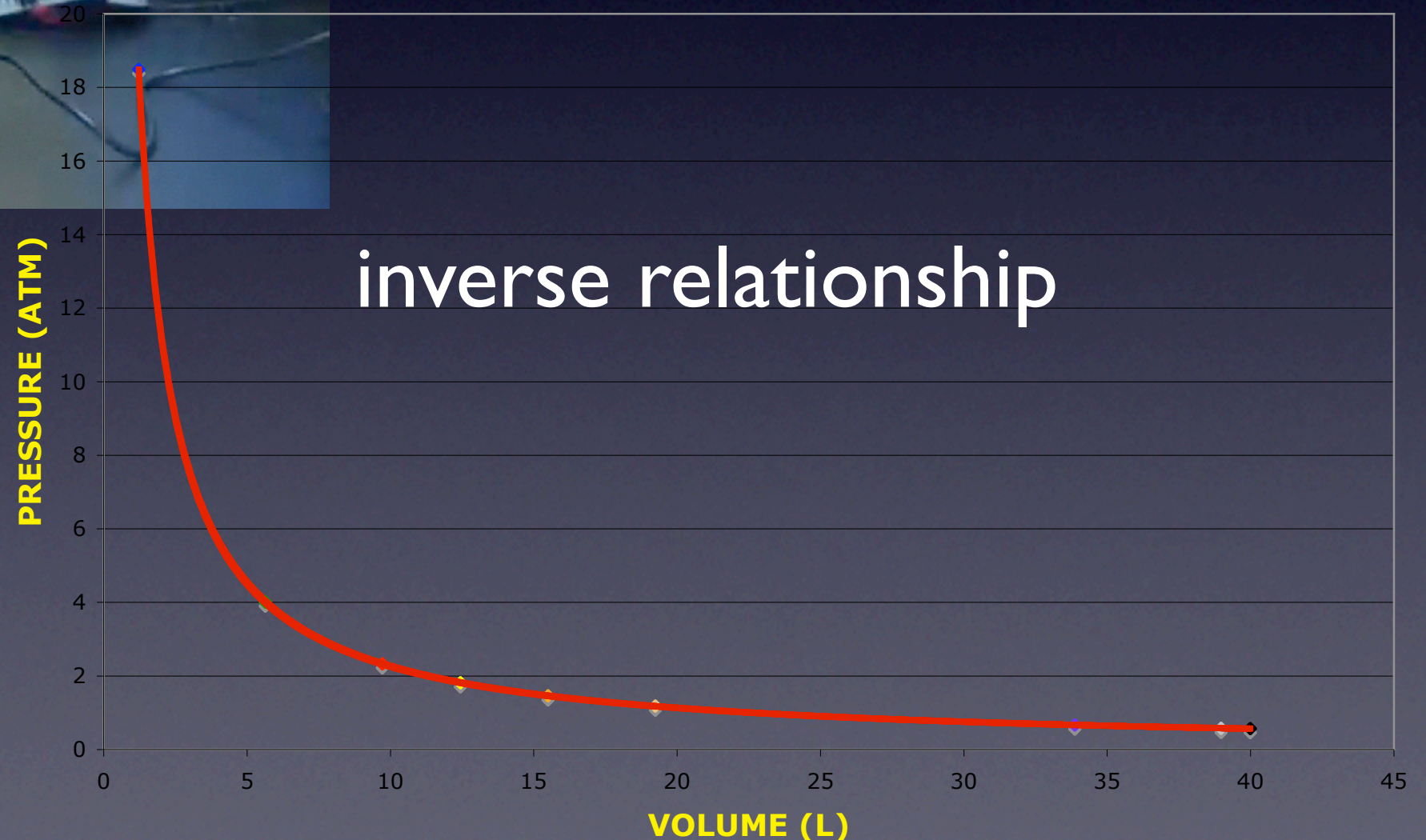
Increase pressure →
decrease volume

PRESSURE VS. VOLUME

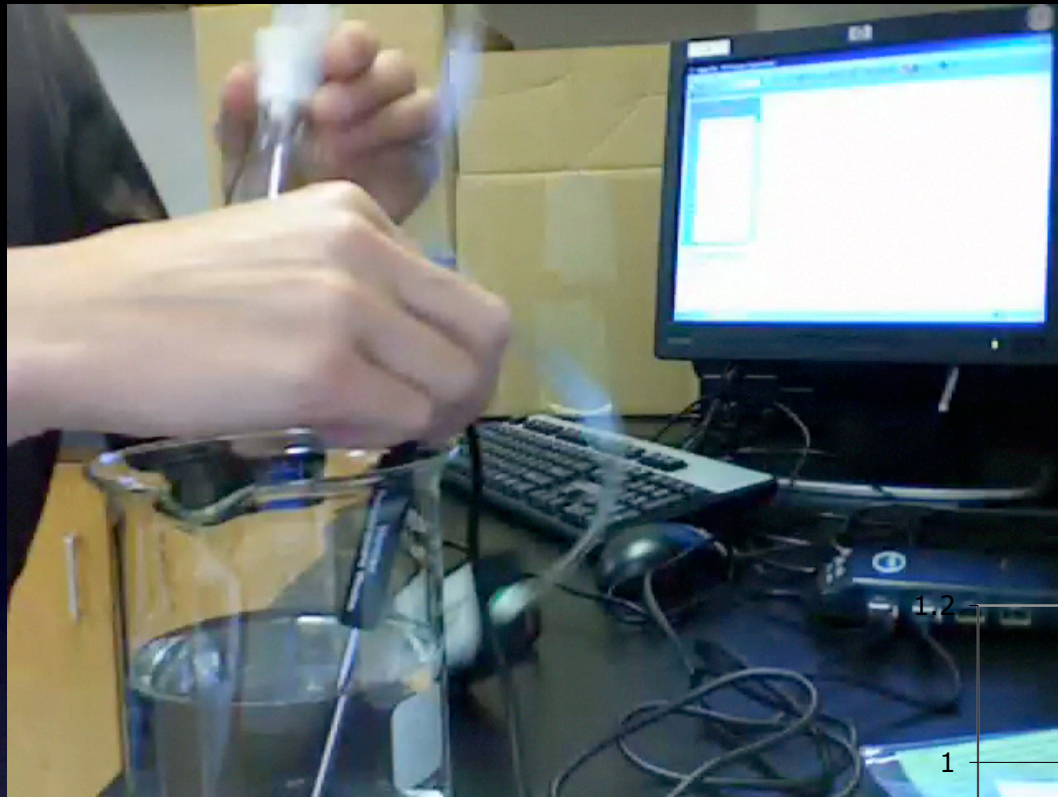
BOYLE'S LAW

$$P_1V_1 = P_2V_2$$

demo!



How are temperature and pressure in a gas related?

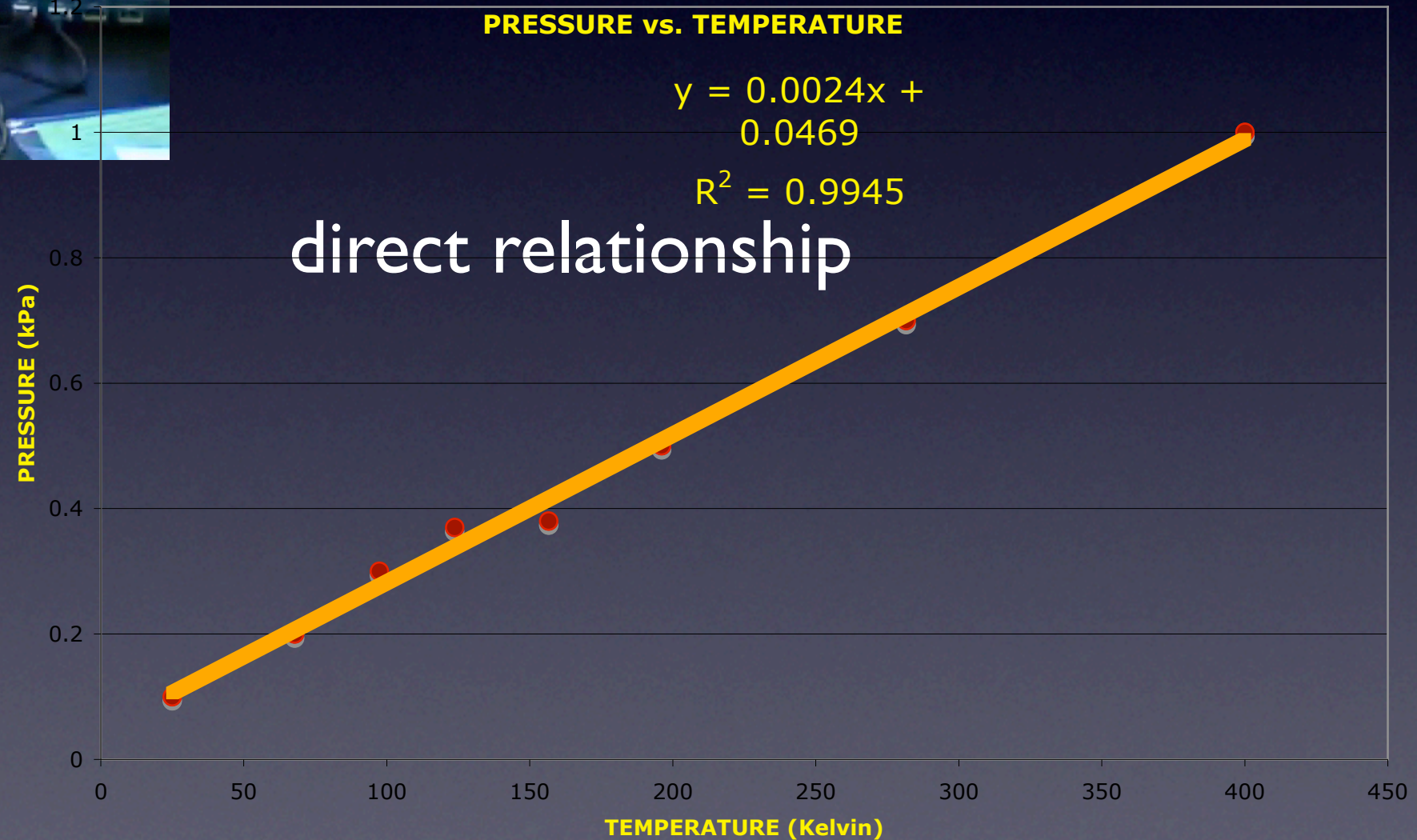


Increase temperature...
increase pressure!

Gay-Lussac's
Law

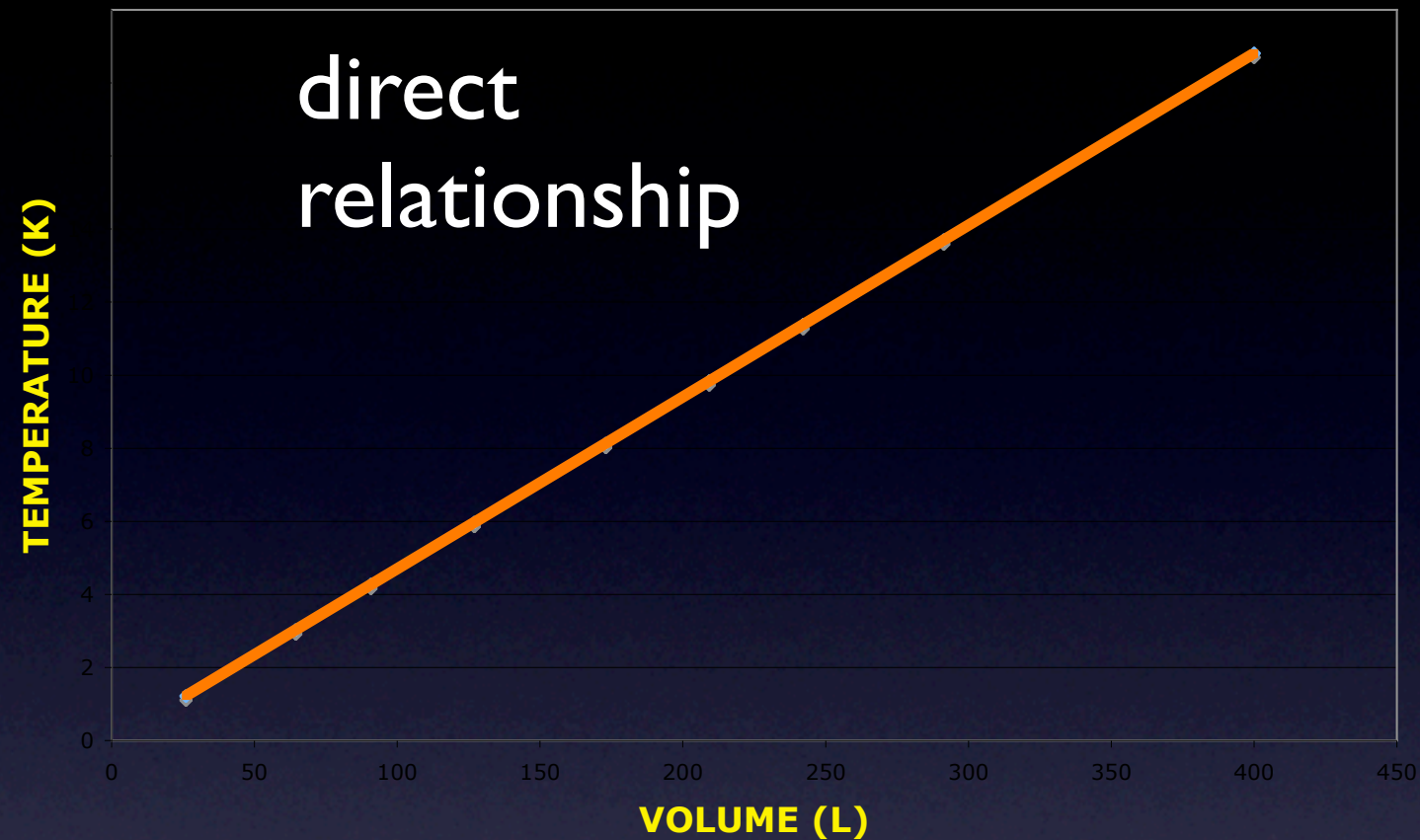
$$\frac{P_1}{T_1} = \frac{P_2}{T_2}$$

demo!



How are temperature and volume in a gas related?

VOLUME VS. TEMPERATURE



decrease temperature...

decrease volume

CHARLES' LAW

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$